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EXAMINER
WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
1742	7

DATE MAILED: 05/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/930,172	Applicant(s) TANAKA ET AL.	
	Examiner Harry D Wilkins, III	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 April 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Claims 1-7 are pending.

2. The rejections under 35 USC 102 based on Murakami et al and Maeda have been withdrawn in view of Applicant's amendment of the claims.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al (US 5,413,643) in view of Ochi et al (EP 0933440).

Murakami et al teach (see abstract) a method of making a rolling bearing constituted of an inner ring, an outer ring and a rolling element, which includes (see col 2, lines 50-56) starting with a steel, treating the steel by carburizing or carbonitriding (followed by quenching, see figure 2(a)) and finally a high temperature tempering at 220-240°C.

However, Murakami et al is silent about the contents of P, S, Al, Ti, O and N.

Ochi et al teach a similar case hardening steel (i.e.-same field of endeavor) that teaches limiting each of these elements to certain ranges. Ochi et al teach (see paragraphs 20, 21, 23, 29, 30 and 31) that P should be maintained at less than 0.025 wt% to avoid degrading properties of case hardening steels, S should be kept at 0.001-0.01 wt% (desirable) to maintain machinability without segregation of MnS, Al should be

added at 0.015-0.04 wt% to insure effective grain growth suppression, Ti should be kept below 0.0025 wt% (desirable) to avoid a reduction in the suppression of grain growth, O should be kept below 0.0012 wt% (desirable) to avoid an increase in oxides which cause rolling fatigue failure and N should be added at 0.006-0.020 wt% to achieve grain refinement.

Therefore, it would have been obvious to one of ordinary skill in the art to have limited the elements P, S, Al, Ti, O and N to the ranges taught by Ochi et al in the steel of Murakami et al because of the reasons for maintaining these elements at the disclosed levels provided for by Ochi et al in paragraphs 20, 21, 23, 29, 30 and 31.

Murakami et al teach (see abstract and col 5, line 59 to col 6, line 7) that the steel has a composition that overlaps the presently claimed composition ranges and Ochi et al teach the ranges of P, S, Al, Ti, O and N.

	Claimed	Murakami et al in view of Ochi et al	Overlap between Murakami et al and claimed
C	0.1-0.4 wt%	0.1-0.8 wt%°	At 0.1-0.4 wt%
Si	0.3-3.0 wt%	0.15-1.00 wt%	At 0.3-1.0 wt%
Mn	0.2-2.0 wt%	0.2-1.5 wt%	At 0.2-1.5 wt%
P	<0.03 wt%	<0.025 wt%	At <0.025 wt%
S	<0.03 wt%	0.001-0.01 wt%	At 0.001-0.01 wt%
Cr	0.3-2.5 wt%	0.5-3.0 wt%	At 0.5-2.5 wt%
Ni	0.1-2.0 wt%	0.08-1.0 wt%	At 0.1-1.0 wt%
Al	<0.05 wt%	0.015-0.04 wt%	At 0.015-0.04 wt%
Ti	<0.003 wt%	<0.0025 wt%	At <0.0025 wt%
O	<0.0015 wt%	<0.0012 wt%	At <0.0012 wt%
N	<0.025 wt%	0.006-0.020 wt%	At 0.006-0.020 wt%

°For steels to be carburized/carbonitrided, the steel contains 0.1-0.8 wt% C (see col 2, lines 50-56)

Murakami et al teach (see Table 2) that the inventive steels have hardness in the range of 720-782 HV, which is about HRC 59-61. Thus, Murakami et al in view of Ochi

et al teach a nearly identical method, with an identical composition, which produces identical properties as the presently claimed invention.

Regarding the process limitation of high temperature tempering at 250-350°C, the claim is a product-by-process claim and any art that discloses the same product teaches the claim, even if made by a materially different process.

> "Even though product - by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product - by - process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985)

Regarding the presence of Mo in the steel of Maeda, the present claim recites a composition "containing" certain elements. This language is interpreted to mean that the composition is open to additional elements, even in major amounts.

Regarding claim 2, Murakami et al teach (see col 5, line 59 to col 6, line 7) that the steel may contain 0.08-2.0 wt% Mo. Murakami et al do not teach adding V. Ochi et al teach (see paragraph no. 28) that V is added at 0.03-0.5 wt% for adding strength and hardenability to case hardening steels. Therefore, it would have been obvious to one of ordinary skill in the art to have added 0.03-0.5 wt% V as taught by Ochi et al to the case hardening steel of Murakami et al because Ochi et al teach that V adds strength and hardenability to the steel.

Regarding claims 3 and 7, the range of Mn+Ni taught by Murakami et al is 0.28-2.5 wt%. Thus, Ochi et al teach an overlapping range for Mn+Ni at 1.5-2.5 wt%. It would have been within the expected skill of a routineer in the art to have optimized the amount of Mn and Ni in the alloy of in order to maximize the toughness and shock resistance (see Murakami et al at col. 4, lines 14-17 and col. 6, lines 2-5).

Regarding claim 4, Murakami et al teach a method, as above, including starting with a steel material having a composition as claimed (when taken in view of Ochi et al), performing carburizing and/or carbonitriding followed by quenching, and finally tempering at 220-240°C. Thus, Murakami et al teaches the method substantially as claimed. Murakami et al do not meet the claimed range of the tempering temperature. However, the value disclosed by Murakami et al is close enough to the presently claimed range (i.e.- 240°C vs. 250°C) that one of ordinary skill in the art would have expected that the two processes would produce the same properties in the resulting bearing. If the range of the prior art and claimed range do not overlap, obviousness may still exist if the ranges are close enough that one would not expect a difference in properties. *In re Woodruff* 16 USPQ 2d 1934; *Titanium Metals Corp. v. Banner* 227 USPQ 773 (Fed. Cir. 1985); *In re Aller* 105 USPQ 233 and MPEP 2144.05 I.

Regarding claims 5 and 6, Murakami et al teach (see col. 2, lines 50-56 and col. 6, lines 30-39 along with figures 2(a)-2(c)) that between the carburizing quenching and the tempering, the steel is annealed (fig. 2(b)) and quenched (i.e.-secondary quenching).

5. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda (US 6,197,128) in view of Ochi et al (EP 0933440).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in

the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Maeda teaches (see abstract) a rolling bearing component with a rolling bearing ring and a rolling element made from a composition as below.

However, Maeda is silent about the contents of P, S, Al, Ti, O and N.

Ochi et al teach a similar case hardening steel (i.e.-same field of endeavor) that teaches limiting each of these elements to certain ranges. Ochi et al teach (see paragraphs 20, 21, 23, 29, 30 and 31) that P should be maintained at less than 0.025 wt% to avoid degrading properties of case hardening steels, S should be kept at 0.001-0.01 wt% (desirable) to maintain machinability without segregation of MnS, Al should be added at 0.015-0.04 wt% to insure effective grain growth suppression, Ti should be kept below 0.0025 wt% (desirable) to avoid a reduction in the suppression of grain growth, O should be kept below 0.0012 wt% (desirable) to avoid an increase in oxides which cause rolling fatigue failure and N should be added at 0.006-0.020 wt% to achieve grain refinement.

Therefore, it would have been obvious to one of ordinary skill in the art to have limited the elements P, S, Al, Ti, O and N to the ranges taught by Ochi et al in the steel of Maeda because of the reasons for maintaining these elements at the disclosed levels provided for by Ochi et al in paragraphs 20, 21, 23, 29, 30 and 31.

	Claimed	Maeda in view Of Ochi et al	Overlap
C	0.1-0.4 wt%	0.3-0.6 wt%	At 0.3-0.4 wt%
Si	0.3-3.0 wt%	0.1-0.35 wt%	At 0.3-0.35 wt%
Mn	0.2-2.0 wt%	1.1-1.5 wt%	At 1.1-1.5 wt%
P	<0.03 wt%	<0.025 wt%	At <0.025 wt%

S	<0.03 wt%	0.001-0.01 wt%	At 0.001-0.01 wt%
Cr	0.3-2.5 wt%	0.5-2.0 wt%	At 0.5-2.0 wt%
Ni	0.1-2.0 wt%	0.2-0.6 wt%	At 0.2-0.6 wt%
Al	<0.05 wt%	0.015-0.04 wt%	At 0.015-0.04 wt%
Ti	<0.003 wt%	<0.0025 wt%	At <0.0025 wt%
O	<0.0015 wt%	<0.0012 wt%	At <0.0012 wt%
N	<0.025 wt%	0.006-0.020 wt%	At 0.006-0.020 wt%

Maeda teaches (see col 4, lines 5-11, col 6, lines 44-49, col 7, lines 38-45 and Table 5) that the steel is subjected to carburizing or carbonitriding and then subjected to tempering at a temperature of at least 230°C. Though there is no express disclosure of a quenching process after the carburizing/carbonitriding step, the process would have been expected to contain such a step as quenching after carburizing/carbonitriding was conventional in the art to cool the bearing to a temperature at which it could be handled for further processing and for providing hardening of the alloy. For support of conventional quenching, see Murakami et al at fig. 2(a). The example in Table 5 of Maeda was tempered at 230°C has a surface hardness of 745 Hv, which is about HRC60.

Regarding the process limitation of high temperature tempering at 250-350°C, the claim is a product-by-process claim and any art that discloses the same product teaches the claim, even if made by a materially different process.

Regarding the presence of Mo in the steel of Maeda, the present claim recites a composition "containing" certain elements. This language is interpreted to mean that the composition is open to additional elements, even in major amounts.

Regarding claim 2, Maeda teaches (see abstract) that the steel may contain 0.15-0.5 wt% Mo. Maeda does not teach adding V. Ochi et al teach (see paragraph no.

28) that V is added at 0.03-0.5 wt% for adding strength and hardenability to case hardening steels. Therefore, it would have been obvious to one of ordinary skill in the art to have added 0.03-0.5 wt% V as taught by Ochi et al to the case hardening steel of Maeda because Ochi et al teach that V adds strength and hardenability to the steel.

Regarding claim 3, the range of Mn+Ni taught by Maeda is 1.3-2.1 wt%. Thus, Maeda teaches an overlapping range for Mn+Ni at 1.5-2.1 wt%.

Regarding claim 4, Maeda teaches a method, as above, including starting with a steel material having a composition as claimed (when taken in view of Ochi et al), performing carburizing and/or carbonitriding followed by quenching, and finally tempering at 230°C. Thus, Maeda teaches the method substantially as claimed. Maeda does not meet the claimed range of the tempering temperature. However, the value disclosed by Maeda is close enough to the presently claimed range that one of ordinary skill in the art would have expected that the two processes would produce similar results. If the range of the prior art and claimed range do not overlap, obviousness may still exist if the ranges are close enough that one would not expect a difference in properties. *In re Woodruff* 16 USPQ 2d 1934; *Titanium Metals Corp. v. Banner* 227 USPQ 773 (Fed. Cir. 1985); *In re Aller* 105 USPQ 233 and MPEP 2144.05 I.

6. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al (5,595,610) in view of Ochi et al (EP 09334440) and Mitamura (GB 2,235,698 (English equivalent of JP 03-153842)).

Maeda et al teach (see claims 1 and 6) a case hardening steel that has a composition which overlaps the presently claimed composition ranges.

However, Maeda et al are silent regarding the contents of P, Ti and O in the compostion.

Ochi et al teach a similar case hardening steel (i.e.-same field of endeavor) that teaches limiting each of these elements to certain ranges. Ochi et al teach (see paragraphs 29, 30 and 31) that P should be maintained at less than 0.025 wt% to avoid degrading properties of case hardening steels, Ti should be kept below 0.0025 wt% (desirable) to avoid a reduction in the suppression of grain growth and O should be kept below 0.0012 wt% (desirable) to avoid an increase in oxides which cause rolling fatigue failure.

Therefore, it would have been obvious to one of ordinary skill in the art to have limited the elements P, Ti and O to the ranges taught by Ochi et al in the steel of Maeda because of the reasons for maintaining these elements at the disclosed levels provided for by Ochi et al in paragraphs 29, 30 and 31.

	Claimed	Maeda et al in View of Ochi et al	Overlap
C	0.1-0.4 wt%	0.03-0.27 wt%	At 0.1-0.27 wt%
Si	0.3-3.0 wt%	0.05-0.35 wt%	At 0.3-0.35 wt%
Mn	0.2-2.0 wt%	0.3-2.0 wt%	At 0.3-2.0 wt%
P	<0.03 wt%	<0.025 wt%	At <0.025 wt%
S	<0.03 wt%	<0.03 wt%*	At <0.03 wt%
Cr	0.3-2.5 wt%	0.03-1.5 wt%	At 0.3-1.5 wt%
Ni	0.1-2.0 wt%	0.4-3.0 wt%	At 0.4-2.0 wt%
Al	<0.05 wt%	0.015-0.1 wt%	At 0.015-0.05 wt%
Ti	<0.003 wt%	<0.0025 wt%	At <0.0025 wt%
O	<0.0015 wt%	<0.0012 wt%	At <0.0012 wt%
N	<0.025 wt%	0.004-0.02 wt%	At 0.004-0.02 wt%
Mo	0.05-2.5 wt%	0.1-1.0 wt%	At 0.1-1.0 wt%

V	0.05-1.0 wt%	0.03-0.5 wt%	At 0.05-0.5 wt%

*The claim contains a typographical error, it should be <0.03 wt% as per col 2, line 30.

Maeda et al teach (see claim 1) that the method of production includes carburizing and/or carbonitriding followed by quenching. The process also includes (see Figures 3 and 4) tempering, but at a temperature of 170°C.

The differences between the invention of Maeda et al in view of Ochi et al and the present invention are that (1) Maeda et al do not teach that the tempering step occurs at temperatures of 250-350°C and (2) Maeda et al do not teach that the steel is made into a rolling bearing component having an inner ring, outer ring and a rolling element.

Mitamura teaches (see last 2 paragraphs on page 6 and 1st paragraph on page 7) a rolling bearing constituted of a bearing ring and a rolling element made from a steel with a composition similar to the steel of Maeda et al. Mitamura teaches (see paragraph spanning pages 19 and 20) that the steel is subjected to a high temperature tempering (at 240-550°C) in order to impart dimensional stability at high temperatures to the steel by reducing the amount of retained austenite to below 3 vol%.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the high temperature tempering step of Mitamura to the steel of Maeda et al because the tempering step improves the dimensional stability of a rolling bearing at higher operating temperatures and it would have been obvious to make a rolling bearing from the case hardening steel of Maeda et al because it has properties, such as high surface hardness after carburizing, that make it ideal for use as a rolling bearing.

Regarding the claimed surface hardness, one of ordinary skill in the art would have expected the steel of Maeda et al in view of Ochi et al and Mitaura to have the hardness as claimed because it has an identical composition and is treated by an identical method.

Regarding claim 2, see table above regarding Mo and v content.

Regarding claim 3, the range of Mn+Ni taught by Maeda et al is 0.7-5.0 wt%. Thus, Maeda et al teach an overlapping range for Mn+Ni at 1.5-4.0 wt%. It would have been within the expected skill of a routineer in the art to have optimized the amount of Mn and Ni in the alloy of in order to maximize the hardenability and toughness (see Maeda et al at col. 4, lines 6-10 and lines 17-27).

7. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ochi et al (EP 0933440) in view of Mitamura (JP 03-153842).

Ochi et al teach (see abstract) a case hardening steel that has a composition which overlaps the presently claimed composition ranges.

	Claimed	Ochi et al	Overlap
C	0.1-0.4 wt%	0.1-0.4 wt%	At 0.1-0.4 wt%
Si	0.3-3.0 wt%	0.02-1.3 wt%	At 0.3-1.3 wt%
Mn	0.2-2.0 wt%	0.3-1.8 wt%	At 0.3-1.8 wt%
P	<0.03 wt%	<0.025 wt%	At <0.025 wt%
S	<0.03 wt%	0.001-0.15 wt%	At 0.001-0.03 wt%
Cr	0.3-2.5 wt%	0.4-1.8 wt%	At 0.4-1.8 wt%
Ni	0.1-2.0 wt%	0.1-3.5 wt%	At 0.1-2.0 wt%
Al	<0.05 wt%	0.015-0.04 wt%	At 0.015-0.04 wt%
Ti	<0.003 wt%	<0.01 wt%*	At <0.0025 wt%*
O	<0.0015 wt%	<0.0025 wt%**	At <0.0012 wt%**
N	<0.025 wt%	0.006-0.02 wt%	At 0.006-0.02 wt%
Mo	0.05-2.5 wt%	0.02-1.0 wt%	At 0.05-1.0 wt%
V	0.05-1.0 wt%	0.03-0.5 wt%	At 0.05-0.5 wt%

*Ochi et al provide (see paragraph 30) a desired range of <0.0025 wt% Ti.
**Ochi et al provide (see paragraph 31) a desired range of <0.0012 wt% O.

Ochi et al teach (see paragraph 61) that the method of production includes carburizing followed by quenching (water cooling).

The differences between the invention of Ochi et al and the present invention are that (1) Ochi et al do not teach a tempering step that occurs at temperatures of 250-350°C and (2) Ochi et al do not teach that the steel is made into a rolling bearing component having an inner ring, outer ring and a rolling element.

Mitamura teaches (see last 2 paragraphs on page 6 and 1st paragraph on page 7) a rolling bearing constituted of a bearing ring and a rolling element made from a steel with a composition similar to the steel of Maeda et al. Mitamura teaches (see paragraph spanning pages 19 and 20) that the steel is subjected to a high temperature tempering (at 240-550°C) in order to impart dimensional stability at high temperatures to the steel by reducing the amount of retained austenite to below 3 vol%.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the high temperature tempering step of Mitamura to the steel of Ochi et al because the tempering step improves the dimensional stability of a rolling bearing at higher operating temperatures and it would have been obvious to make a rolling bearing from the case hardening steel of Ochi et al because it has properties, such as high surface hardness after carburizing, that make it ideal for use as a rolling bearing.

Regarding the claimed surface hardness, one of ordinary skill in the art would have expected the steel of Ochi et al in view of Mitaura to have the hardness as claimed because it has an identical composition and is treated by an identical method.

Regarding claim 2, see table above regarding the presence of Mo and V.

Regarding claim 3, the range of Mn+Ni taught by Ochi et al is 0.4-5.3 wt%. Thus, Ochi et al teach an overlapping range for Mn+Ni at 1.5-4.0 wt%. It would have been within the expected skill of a routineer in the art to have optimized the amount of Mn and Ni in the alloy of in order to maximize the strength and hardenability (see Ochi et al at paragraphs 19 and 27).

Response to Arguments

8. Applicant's arguments filed 17 April 2003 have been fully considered but they are not persuasive. Applicant has argued that:

a. Murakami et al fail to teach the claimed tempering at 250-350°C;

b. Maeda fails to expressly teach quenching at the end of carburizing/carbonitriding;

c. The motivation to combine the high temperature tempering of Mitamura with the steel of Maeda et al or with Ochi et al is lacking;

d. It has not been established that one of ordinary skill in the art would have had a reasonable expectation of successfully applying the high temperature tempering treatment of Mitamura to the steel of Maeda et al or Ochi et al; and,

e. Mitamura teaches away from the present invention by requiring 3.0% of Mo.

In response to Applicant's first argument, though Murakami et al teach tempering at 220-240°C, and not within the *presently* claimed range of 250-350°C, the range of the tempering temperature is close enough that one of ordinary skill in the art would have

expected the two tempering steps to produce the same properties in the final bearing product.

In response to Applicant's second argument, though Maeda fails to expressly teach the quenching step, it was conventional in the art to apply quenching at the end of carburizing/carbonitriding, as can be seen throughout the other references. The quenching is applied to induce a hardening of the bearing surface.

In response to Applicant's third argument, the English equivalent GB 2,235,698 of JP 03-153842, provides further clarification into the motivation to perform the high temperature tempering treatment, particularly in the paragraph spanning pages 19 and 20 as well as the lower paragraph on page 9 and the first paragraph on page 10, where it is taught that the high temperature tempering is applied to impart dimensional stability at higher operating temperatures. Thus, the motivation to combine the high temperature tempering step of Mitamura with the disclosures of Maeda et al or Ochi et al comes from Mitamura who teaches that the high temperature tempering improves the dimensional stability of the alloy at higher operating temperatures.

In response to Applicant's fourth argument, the compositions of Mitamura, Maeda et al and Ochi et al are very similar. In fact, the steel composition of Mitamura and Ochi et al overlap for the major ingredients (C, Cr, Si and Mn). The values of Cr, Si and Mn overlap between Mitamura and Maeda et al, and the values of C are very close (0.27 wt% vs, 0.30 wt%). Thus, because the compositions are so similar, one of ordinary skill in the art would have had a reasonable expectation of successfully

applying the high temperature tempering step of Mitamura to the steels of Maeda et al or Ochi et al.

In response to Applicant's fifth argument, Mitamura actually teaches including Mo as an optional element and at less than 3.0 wt%. See page 15.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 703-305-9927. The examiner can normally be reached on M-Th 6:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 703-308-1146. The fax phone numbers for

the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw
May 22, 2003

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700